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IN THIS ISSUE

THE AGRICULTURE OF GREECE

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CONTENTS

Page

THE AGRICULTURE OF GREECE 75

Factors affecting agriculture 75

Population density 77

Topography 78

Climate 78

General economic conditions 79

Farm cooperation 81

Ownership, distribution of land, and size of holdings 82

Land reclamation 84

Soils and soil improvement 84

Productivity 86

Farm machinery 87

Degree of dependence upon foreign products 87

Fruits and nuts 90

Grapes and wine 91

Tobacco 94

Animal husbandry 94

Agriculture and the food situation during wartime 95

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THE AGRICULTURE OF GREECE . . . . .

By Clayton E. Whipple*

Despite its mountainous surface and maritime position, Greece is essentially an agricultural country. Landholdings are, however, relatively small and farming methods outmoded. Some farmers have been inclined to overemphasize a single crop, with consequent dependence upon purchases of other products needed for subsistence, and the country as a whole has depended heavily upon imported supplies of many agricultural items. Because of their low standards of living, however, the peasants have been able to produce most of their own necessities, except wheat. Even in the face of wartime conditions, they manage to carry on, and their crops have been less affected than those of some other European countries.

FACTORS AFFECTING AGRICULTURE

Greece has a total surface of 32 million acres or a little more than 50,000 square miles, of which only 19 percent (6,100,000 acres) was arable land in 1933-37. In the 1928 census 60.2 percent of all gainfully employed people were classified as agricultural; in 1935 the percentage was 60.3. No reliable classification of the total population into agricultural and nonagricultural categories has been made, but these figures indicate that of the 1935 population of 6,793,000 persons at least 4,076,000, or 60 percent, were agricultural and 2,717,000, or 40 percent, nonagricultural.

According to the Supreme Economic Council of Greece (*1*)[1], the national income in 1938 was about 50 billion drachmas ($444,000,000). (See table 1.) Agriculture contributed nearly 23 billion drachmas, or 45 percent, and the annual agricultural income for the period 1933-37 averaged over 17 billion drachmas or 37 percent of the total national income. Analysis of these figures indicates that income from livestock and livestock products is not included in agricultural income; hence the total farm income probably is higher. Other economists have made estimates varying somewhat from those mentioned above, as a result of different interpretations of "national" and "agricultural" income. One economist (*1*) gives a break-down of national income for 193 totaling 51,644,000,000 drachmas ($443,784,000), about the same as that of the Supreme Economic Council.

Although income from trading, emigrants' remittances, the mercantile marine, and other transportation activities was not included in calculations of the total national income and its component parts, agriculture undoubtedly represented a major part.

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* Office of Foreign Agricultural Relations.

[1] Italic numbers in parentheses refer to Literature Cited, page 96.

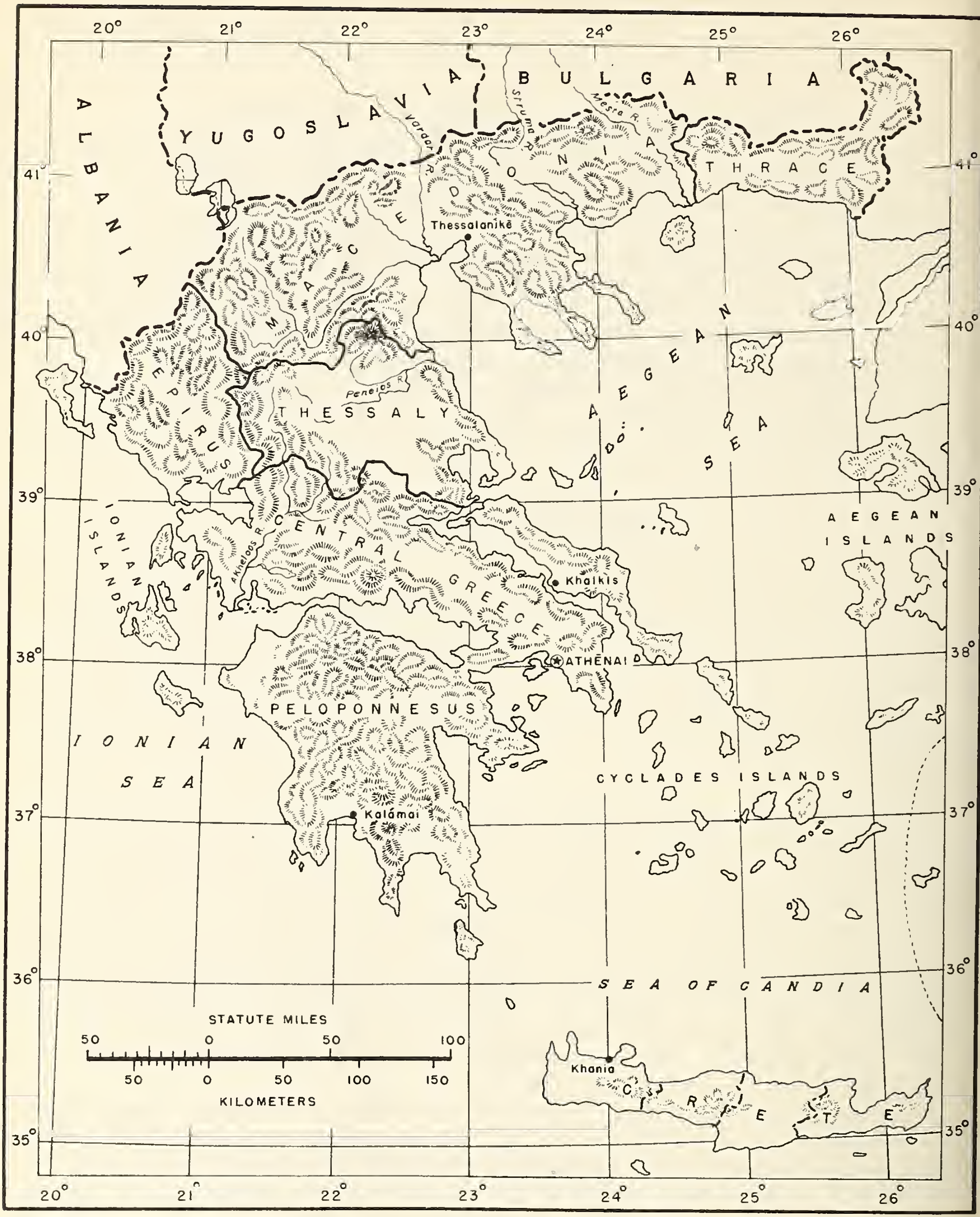

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FIGURE 1 -Map of Greece.

TABLE 1.- *National income of Greece, according to industry, 1938*

ITEM	NATIONAL INCOME FROM AGRICULTURAL ENTERPRISES	 FROM OTHER ENTERPRISES	 TOTAL[1]
Agricultural production:	*Million drachmas*	*Million drachmas*	*Million dollars*
Crop	22,656	—	201
Livestock	13,819	—	123
Total	36,475	—	324
Industrial production	—	13,586	121
Minerals and mineral products	—	797	7
Forestry	—	786	7
Total	—	15,169	135
Grand Total	—	—	459

[1] Exchange rate: 1 drachma = .8879 U.S. cent.

Another indication of the importance of agriculture in the national economy may be secured from a comparison (table 2) of the percentages of total value of exports represented by the more important commodities during the 1933-37 period. Tobacco alone accounted for an average of 43.6 percent of total Greek exports in those years. Imports of the more important commodities for the same period further emphasize the specialized nature of the agricultural economy of Greece.

TABLE 2.-*Foreign trade in specified commodities of Greece, expressed in percentages of total value, 1933-37*

COMMODITY	1933	1934	1935	1936	1937	AVERAGE 1933-37
Exports:	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Tobacco	33.6	37.1	50.2	46.0	45.9	43.6
Dried raisins	26.1	25.9	17.4	17.7	14.9	19.4
Olive oil	8.9	3.2	4.3	3.7	2.5	4.2
Olives	2.4	4.0	4.1	3.9	2.7	3.4
Wine	6.0	2.8	2.1	2.5	2.3	2.9
Total	77.0	73.0	78.1	73.8	68.3	73.5
Imports:						
Cereals[1]	30.4	10.3	16.5	19.9	20.9	19.6
Other foodstuffs[2] . . .	10.4	10.4	8.9	8.5	7.8	8.9
Livestock[3].	3.6	5.1	4.5	3.7	2.8	3.8
Raw textiles and fibers[4]	4.6	5.0	4.8	4.0	3.1	4.2
Total	49.0	30.8	34.7	36.1	34.6	36.5

[1] Wheat, wheat flour, corn, millet, rice, barley, and other cereals.

[2] Meats, dairy products, fish, pulses, vegetables, spices, sugar, molasses, fruits, and nuts.

[3] Cattle, goats, sheep, hogs, horses, mules, asses, and fowls.

[4] Flax, hemp, jute, cotton and wool.

Compiled from BULLETIN MENSUEL DU COMMERCE SPECIAL, December issues, 1934-38.

Population Density

According to the Royal Institute of International Affairs in London *(7)*, in 1931 there were 870 inhabitants per square mile of cultivated land in Greece as compared with 470 in Yugoslavia (1930), 380 in Hungary (1931), 365 in Bulgaria (1927), and 380 in Rumania (1931). Official figures for the years 1933-37 (table 3) indicate an average annual density of 135 persons per square mile of the total land area and 790 per square mile of cultivated land, or approximately the same as the London figure for 1931. This relatively high density of population, combined with unfavorable topography and climate, plus a higher degree of urbanization than found in the other Balkan countries, helps to explain why Greece produces and exports tobacco, raisins, olive oil, etc., and imports cereals, livestock for slaughter, and dairy products.

TABLE 3.—*Density of population in Greece, by region and Province, average 1933-37*

REGION AND PROVINCE	PERSONS PER ACRE	
	TOTAL AREA	CULTIVATED AREA
	Number	*Number*
Northern Greece:		
Thrace	.16	.79
Macedonia	.19	.96
Epirus	.15	1.48
Central and Southern Greece:		
Thessaly	.16	.70
Central Greece and Euboea	.28	1.81
Peloponnesus	.21	1.16
Island Greece:		
Ionian Islands	.47	2.98
Cyclades Islands	.22	2.25
Aegean Islands	.34	2.52
Crete	.20	1.78
Total Greece	.21	1.23

Topography

Topography is a fundamental factor in the agricultural structure of Greece, affecting the rainfall, temperature, and the composition and structure of the soil. A large part of the country is unproductive, and the unproductive area has been estimated as being about 16,800 square miles *(8)* of the total surface. Unfortunately, most of the mountainous areas are unforested, and a large part of the area classified as forested is covered only with brush and shrubs. Run-off of rain and early melting of snow result in erosion damage and drying up of streams early in the summer, thus affecting irrigation, so important in the dry summer climate of Greece. Generally speaking, and apart from Thessaly, Macedonia, and Thrace, the plains are small and often consist of only mountain-enclosed river basins.

Climate

The climate of Greece is often characterized as being Mediterranean, with hot, dry, cloudless summers, tempered by frequent north winds, and mild, rainy, and cloudy winters. The spring and autumn seasons are very short; in fact, the latter hardly exist. Southern Greece is more arid than northern Greece, eastern Greece has less rainfall than western Greece, and southeastern Greece is the most arid section of the country *(9)*. A careful study of the climate of Greece indicates, however, that only a small portion of the country can be classified as Mediterranean and that continental and even Alpine climates exist in various parts of the country *(6)*. In fact, the Mediterranean climate described above really exists only in the eastern maritime part of the Peloponnesus, Central Greece and Euboea, Crete, and the Aegean Islands. A modified Mediterranean climate, with much heavier rainfall, occurs on the western side of the peninsula, but it differs greatly from that of eastern Greece, especially in terms of precipitation.

Farther north and to the east, in Thessaly, central and eastern Macedonia, and Thrace, the climate is of the modified continental type, with colder winters and hot, usually dry summers. The higher altitudes have much snow and frost. These relatively extreme alternations of cold winters and hot summers, including snow to cover the winter grains and moisten the land for spring-planted grains as well, are well adapted for growing cereals *(6)*. In some sections sufficient summer rainfall and a long vegetative season permit the growing of maize and of deciduous fruits. Eastern Macedonia and Thrace have dry areas, with soils low in humus, where the small-leaved "Oriental" or "Turkish" tobacco attains the highest quality and brings the highest price. Central Greece and Thessaly are subject to violent winds in spring and early summer, which are quite destructive to crops.

The Pindus Mountain area, running slightly to the west of Central Greece, and its foothill regions, as well as Arkadia in the Peloponnesus and other mountainous regions, have an Alpine or central European climate, with cold winters and mild summers and abundant precipitation throughout the year. Such forested lands as Greece still possesses are found here. In general, these consist of conifers, especially cypress, and the Aleppo and stone pines. The bulk of the forest cover consists, however, of shrub thickets, known locally as "Maquis." In ancient times the forests were of much greater extent and higher quality, but neglect, erosion, and harmful grazing by nomadic shepherds and goatherds have seriously depleted the value of the Greek forested area and, moreover, of the plains below. Similarly, there are significant variations in temperature. At least one meteorological station is located in each of the 10 Provinces, and reports of the stations show that there are also significant differences in temperature, and rainfall as well, within each Province. For example, on the Island of Crete, rainfall at Khania is much higher than in the central and eastern parts of the island.

An important factor in Greek agriculture in all regions of the country, apart from the western coast, Ionian Islands, and the mountainous regions of Macedonia and Thessaly, are the hot dry summer winds. These strong winds, known as the sirocco or locally as the "vardaris" (Vardar), blow for days at a time and often do great damage to the crops in central Macedonia, Thessaly, and parts of Central Greece. The regular northerly etesian winds, which bring no moisture, actually tend to prevent rainfall in the Cyclades and Aegean Islands. The western mountains cut off the rain-bearing winds from the Mediterranean and Adriatic and account for the dry summers of eastern Greece.

GENERAL ECONOMIC CONDITIONS

The combination of factors involved in Greek agriculture, such as the small size of farms, primitive farming techniques, etc., results in a low farm income. An economist *(1)* has calculated the average farm income in 1936 at 13,300 drachmas, or about $123, which is comparatively one of the lowest in Europe. The gross income, including the value of food consumed and all other income in addition to cash income, does not exceed $300 on the average. Returns, of course, vary from region to region. Farmers raising tobacco in Thrace, Macedonia, and some other parts of Greece secure a larger income on the average, but they plant their whole area to tobacco each year and must purchase all their food and other necessities. In case of a crop failure or sluggish market they face starvation. One-crop farming is also practiced among the currant producers of Crete, the raisin producers of the region around the Gulf of Corinth, and other specialized farmers. The nomadic shepherds sell meat, wool, and milk products but must purchase grain, for food and animal feed, and other necessities. The general farming regions in Thessaly and parts of Macedonia and Thrace have a low cash income but are assured of their simple dietary needs from home production.

Indebtedness is common and at a relatively high rate among Greek farmers. The refugees and colonists are still paying for their newly acquired land, and the world-wide agricultural depression of the 1930's made the problem more difficult due to the fall in the prices of agricultural products. Other farmers are also in debt.

In the past the peasantry, as in other Balkan countries, were at the mercy of the local money lenders, who charged exorbitant rates of interest and often forced the peasants to transfer ownership of land for nonpayment.

Since 1929 the chief factor in agricultural credit has been the Agricultural Bank of Greece, founded in that year. The specialized nature of Greek agriculture, with its concentration in parts of Macedonia, Thrace, and Thessaly on tobacco, a nonfood crop that is sometimes marketed many months or even a year after harvesting, requires large amounts of credit. Similarly, the production of currants, raisins, and olive oil requires credit for producers in order to provide their simple food and other personal needs as well as funds for fertilizer, spraying equipment, packing material, and the like.

A large part of the money loaned by the National Bank prior to 1929 and by the Agricultural Bank since that year has been through credit cooperatives or the credit section of all-purpose cooperatives. In 1930, when the Agricultural Bank really began to function, there were 4,351 credit cooperatives in Greece and several hundred others providing credits for farmers among other functions. Unfortunately, since 1930 the number of credit cooperatives actually operating has decreased, and in 1936 there were only 3,031. About 30 percent of the total number were in Macedonia and 20 percent in the Peloponnesus. This reduction in numbers and efficiency of agricultural cooperatives forced the Agricultural Bank to increase its proportion of direct loans to farmers; as a result provincial and district offices were set up, and agriculturally trained employees of the bank energetically assisted the peasants not only with loans but with advice on conducting their farm operations. In general, the Agricultural Bank of Greece performed a most valuable service toward the improvement of Greek agriculture.

Taxation in Greece is relatively high, the direct and many indirect taxes taking about 25 percent of the national income *(1)*. Moreover, in the opinion of qualified observers, the farming population has paid more than its just share of taxes. During the agricultural crisis of the early 1930's a 5-year moratorium on agricultural debts was declared. Authorities, both Greek and other, agree that the system of taxation in Greece is defective, unjust, and unwise from the point of view of national welfare *(8)*. A major part of this taxation system in Greece, as in other Balkan and Near Eastern countries, is a carry-over from the long period of Ottoman rule. Generally speaking, taxes are collected on gross rather than net income. They are lacking in unity, because each farm commodity is taxed at a different rate and the rates for one commodity differ in various parts of the country. Indirect taxes have worked a great hardship on producers. An example is the collection of an export tax on tobacco which, of course, resulted in reduced payments to tobacco growers during succeeding years, rather than being paid by the foreign companies purchasing the tobacco.

Direct taxation on farm land was at first progressive, varying from 3 to 6 percent, depending upon the income, but in the later 1920's was established at 12 percent. Church and public lands are exempt as are those assigned to refugees and colonists. A 10-percent tax on animal husbandry also imposes a heavy burden, especially on men engaging in a combined crop-animal type of farming, who accordingly first pay a tax on land income and then another tax on animals raised on the same land.

Special production and export taxes are levied on many important products, such as olive oil, tobacco, cocoons, and dried fruit. Owners of more than 15 head of livestock (other than poultry) pay an annual tax of 5 drachmas per head of sheep and goats and 15 drachmas per pig *(8)*. There is an indirect tax of 5 percent on the value of wine consumed in towns, which is of course passed on to the producers when the purchasing price is established. Indirectly, the peasant also pays heavy taxes on salt, matches (a government monopoly), and other necessary items, such as kerosene. The heavy tax on gasoline makes it expensive to travel or move products by truck as does the heavy import duty on automobiles, tires, and other spare parts. On the other hand, grain producers profited by the heavy subsidy given for wheat production during the late 1930's but likewise paid a share of this through increased taxation. During July-June 1930-31 agricultural taxes constituted about 30 percent of all direct taxes, or 1,723,000,000 drachmas, and in addition there were about 511,000,000 drachmas of indirect taxes paid by the farmers.

Greek agriculture in general suffers from an oversupply of labor as a result of the small size of farms and lack of all-season enterprises. Producers of tobacco and dried fruit, particularly, tend to squander a part of their cash income during the inactive months. For harvesting operations, however, all available labor is employed, and on large farms some extra labor, chiefly from the mountain regions where the harvest date is later, is hired.

Farm Cooperation

In 1900 a school teacher in the village of Almyros in Thessaly was impressed with the appalling degree of exploitation of the peasantry by local usurers, who often charged interest rates as high as 100 percent for loans to the peasants of the village. He organized a local credit or loan society and called it Mutual Treasury. This type of organization spread to nearly all communities. Cooperation among farmers is mentioned in the literature of ancient Greece, and in modern times there were such organizations as the Society of Ambelakia in the latter part of the eighteenth century. Animal breeders, pasture-renting groups, and wine producers had mutual-benefit societies in the early nineteenth century, but during the War of Independence, from 1821-31, these organizations ceased to function.

In 1915 a law was passed providing for the establishment of cooperatives on the Raiffeisen type. Two forms of cooperation were provided, namely, limited and unlimited liability, and at least seven persons were required to form a society. In a society of limited liability members subscribing for more than five shares had a second vote, but in no case could more than five votes be allowed to one member. All societies had to set up a reserve fund. Certain privileges were given to cooperative societies by the Cooperative Act. These include exemption from all municipal and communal taxes paid by individual enterprises or stockholders' societies and from import duties on agricultural implements and machinery, seeds, copper sulfate and other spray materials, and essential agricultural requisites imported for the exclusive use of the members of the society. Cooperatives have been protected by law from interference by outside interests. The Government has, however, reserved the right to approve the bylaws of cooperatives and to inspect and audit their books.

Since the Act of 1914 a number of additions and changes have been made producing increased state control and intervention. Compulsory cooperatives for colonists and refugees settled on land as a result of the Agrarian Reform of 1920 have been set up. The main object is to insure payment for the land allotted to colonists and refugees. Hence this cooperative may not be dissolved nor individuals withdraw before complete payment is made. Other compulsory cooperatives include the citrus growers' association of Crete and the vine growers' association in Samos (Aegean Islands), Levkas (Ionian Islands), and Attica and Khalkis (Central Greece and Euboea). All citrus and grape producers in these districts are compelled to collaborate with the cooperative and to deliver, subject to severe legal penalties, their produce to them.

Still other compulsory cooperatives, which are organized by a majority vote of the farmers in a region, include: (1) Those set up for common utilization of land, forests, and pastures; (2) for the grafting of barren and wild trees; and (3) for the development of winter and summer resorts.

Apart from credit cooperatives there are other voluntary cooperatives for various purposes, including marketing, production, and insurance against fire, hail, frost, and the like. In 1936 active cooperatives numbered 3,761 with a total membership of 264,000, holding 420,000 shares of stock. They were of the following types: Credit, 3,021; supply (consumer), 21; marketing, 348; production, 249; and miscellaneous, 122.

Ownership, Distribution of Land, and Size of Holding

The structure of Greek agriculture is predominantly based upon small owner-operated farms. Prior to World War I small farms predominated in southern Greece, but in northern Greece large landholdings occupied about half the total arable land *(8)*. Before the land-reform law of 1917, there were 2,259 large landholdings of 500 to 5,000 acres in size, of which Macedonia had 818, Thessaly 584, Epirus 410, Thrace 84, and other parts of Greece 363. The land-reform decree of 1917 originally provided for reform in Macedonia and Epirus. By the end of 1917, however, a law was passed extending the land reform to all parts of Greece. Numbers of holdings, by types of farm ownership existing in 1929, after the reform had been largely effected, were officially reported as follows: Private individuals, 950,591; state, 162; municipalities, 63; communes, 621; monasteries, 755; churches, 707; associations, 138; schools, 104; banks, 123; other, 103; total, 953,367.

Of the 950,591 properties owned by private individuals or over 99 percent of total landholdings, 757,736 properties, or 79.5 percent, were farmed by their owners. Tenantry included 11,427 long-term tenants, or 1.13 percent of the total number, and 55,949 tenancies of a shorter and more precarious nature. There were 31,861 operators classed as sharecroppers, these people in general being landless peasants to whom land had not yet been assigned by the reform. During the early days of refugee settlement there were many cases of families being placed on land temporarily, while details of permanent settlement were still being worked out, in order to enable them to make a living. During the period 1929-32 practically all these questionable titles were cleared, and in most cases the families secured ownership of the same land previously cultivated. Some nomadic shepherds also had "squatted" on land of doubtful ownership, and these cases also had to be settled. The 55,290 cases classed as "other" included garden plots assigned to artisans, schools, and others.

No official figures are available for present ownership and operation, but the percentage of owner-operated small farms has greatly increased, the proportion of tenancy and sharecropping greatly decreased, and questionable titles have been almost entirely cleared.

Two groups of people were aided by land reform. In the first group were the native Greeks without land. By the provisions of the law of 1917 state and church lands were first utilized for landless farmers, and altogether 133,000 acres of state land and 119,000 acres of community and church lands were assigned to peasant families. (*8*, p. 151). Where land was not sufficient, private holdings were expropriated. The density of population was also a factor in determining how much land should be left to large proprietors. An exception was made of large holdings on which the owner actually lived and managed the property. Likewise in practice properties owned by proprietors who were classified as "war heroes" or descendants of leaders in the wars of liberation of the preceding century and of 1912-13 were usually exempted by the law itself and given special consideration during the reform.

The cultivators and agricultural laborers living on the expropriated land, their widows and orphans, and landless peasants in the immediate vicinity were given the expropriated land (*8*, p. 149). During the period of distribution the peasants paid rent to the proprietors at a rate fixed by the Service of Colonization. Payment for land was provided for through the establishment of a local cooperative of unlimited liability and under government control. The colonists were legally prohibited from selling, mortgaging, or renting their newly secured land. By a law passed in 1927 no further expropriation could be made after 1932. By that date 1,626 areas of land had been expropriated and 272 more were in the process of expropriation. These totaled 2,822,000 acres. The newly created farms varied from 10 to 32 acres in size, depending upon the density of population, fertility of the land, and prevailing type of agriculture. In Central Greece from 25 to 30 acres per family were assigned; in Thessaly, from 12 acres near Trikkala to 32 in Larissa; in Epirus, 10 to 12 acres; and in Macedonia, 10 to 30 acres, depending upon the factors given above.

The second group aided by land reform were the refugees who returned to Greece from abroad as a result of World War I, and particularly after the Asia Minor disaster in 1922 (*8*, p. 150). There were 1,000,000 refugees from Turkey 50,000 from Bulgaria, and 58,000 from Russia. Of this number 135,225 families, comprising 538,048 persons, were settled in 1,954 small rural colonies, of which 1,047 were in Macedonia, 574 in Thrace, and 373 in other districts, especially Thessaly. They were given 144,421 houses, of which 67,048 were built by the Refugee Settlement Commission, 13,487 by the State, and 63,886 were houses vacated by Turks and Bulgarians who emigrated during the exchange of population. A total of 2,073,000 acres of which 1,244,000 were arable, was assigned to the refugees, and of which 1,463,000 acres were vacated by the Turks and Bulgarians leaving the country. The remainder came from state, church, and large landowners. The sizes of the farms varied from 2.5 acres in gardening and tobacco regions to as much as 30 acres in regions where the land was of poor quality. The refugees were forbidden to sell, rent, or mortgage this land. Available statistics indicate that most of the farms were of small size, two-thirds being less than 7.5 acres. Since the checkerboard system (*8*, p. 152) exists on all holdings larger than garden plots, the 953,567 farms were divided into no less than 5,356,819 plots or strips, averaging about 2 acres in size. As a result of the reform, small plots have increased in number, because the large estates were consolidated landholdings, and each refugee or native colonist was given his few acres in several strips of land in different parts of the community.

In Thessaly, Macedonia, and Thrace, the so-called "Domka" system prevails (*8*, p. 152). Under this system the entire area of the community is usually divided into three sections. In any given year all the land owned by the various families of the community in one section is planted, in another section a 1-year fallow is practiced, and in another a longer fallow is used and pastured.

Land Reclamation

Because of the great shortage of land in Greece following the first World War and the coming of the refugees, the Government spent large sums of money for projects leading to an increase in arable land (*3*, p. 29). The majority of the land in pasture is unsuitable for cultivation; hence major attention was given to drainage and flood protection. Plans were made for draining and reclaiming 124,000 acres of totally inundated land and 198,000 acres of seasonally flooded land in the area surrounding the Vardar (Axios) River, in central Macedonia, at an estimated cost of more than $25,000,000. According to the latest available reports, 116,000 acres of formerly inundated land has been made available for cultivation, including 12,000 acres around Lake Artzan-Amatovo, 77,000 acres near Yannitsa Lake and in the Loudia marsh, and 27,000 acres in the vicinity of Lake Achinos. About 29,000 acres have been protected against flood damages.

This project has practically eliminated the principal breeding sources of mosquitos in one of the most malarial regions of Europe. Another project in the Struma (Strymon) Valley in eastern Macedonia has reclaimed 22,000 acres in the Philippi-marsh section and protected other land. Plans for irrigation of some of the land were interrupted by the outbreak of war. A program for reclaiming an additional 25,000 acres was under way in the Struma Valley, the whole plan calling for reclamation of 143,000 acres fully inundated and protection of 80,000 acres flooded during certain seasons at an estimated cost of more than $20,000,000.

Other projects in operation and in some cases partially completed included (*3*, p. 29): (1) Protective dykes to prevent flooding of 195,000 acres by the Pinios (Peneus) River in Thessaly and to permit reclaiming 33,000 acres; (2) a project in Boetia (Central Greece and Euboea) for reclaiming 2,500 acres and flood prevention on 11,000 acres; (3) a project in Epirus for irrigating 35,000 acres, draining 27,000 acres, and flood protection for 25,000 acres; (4) a project in Messinia (Peloponnesus) for irrigation of 9,000 acres and flood protection of 8,000 acres; and (5) a series of small projects in various parts of Greece to irrigate a total of 9,000 acres, to drain and reclaim 10,000 acres, and protect 26,000 acres from flooding.

Irrigation in Greece consists chiefly of small areas irrigated through earthen dams constructed and utilized by the local farmers. Probably only 5 percent of the total cultivated area of Greece is irrigated. In some parts of southern Greece pumps are used, usually operated by driving an animal around the well. In the Peloponnesus there are a few large farms owned by men, who have been in America, and who utilize modern pumps for this purpose.

Soils and Soil Improvement

The soils of Greece, as those of other Mediterranean countries, are highly varied from one locality to another. The statement is frequently made that they are old and worn out. Actually the soils in many parts of Greece are too young for some crops because of the constant water and wind erosion that takes place (*10*, p. 444). Water erosion in the early stages removed the topsoil from the mountain slopes and hillsides to the advantage of the valleys but later resulted in the deposition of gravel and subsoil upon the formerly fertile fields below. Summer winds and dry seasons combined resulted in wind erosion which removed part of the fine silty soil of the plains. Lack of conservation practices and the wasteful overgrazing of grass by nomadic shepherds contributed to the unfavorable situation. Also the prevailing cultural practices followed on the lower plains have not promoted or even maintained soil fertility. Little commercial fertilizer has been used, and supplies of animal manure have been limited by a shortage of cows and draft animals and the custom of grazing sheep and goats in the mountains during the summer. Furthermore, in many barren parts of the country, where wood is scarce or totally lacking, the farmers dry their animal manure and burn it for fuel. Because of the long dry season, green manuring is not practical; hence the prevailing practice has been to leave the land fallow every third or even every second year. Another method of preserving soil fertility, the use of crop rotation, is lacking. In the valleys, wheat and corn grown in succession, with only an occasional year of fallow, have drawn heavily upon soil fertility.

Dr. Marbut, of the United States Department of Agriculture, has stated (*4*, pp. 20-21) that the prevailing soil type in Greece was originally the dark grassland type, similar to that in southern Russia and western Siberia, but recent geologic changes have broken up the soil pattern into a number of small areas. Studies by Dr. Hopkins (2, pp. 441-445) indicate also a great variety of soil structures and types in Greece. Both authorities stress the ever present downward movement of the soil from the slopes and the widespread occurrence of young soils through erosion of the subsoil now exposed on many hillsides. In general, much of the soil in Thessaly, Thrace, and Macedonia is still similar to the soil in southern Russia and is of relatively high agricultural value. The soils in the river valleys are mainly composed of, or derived from, alluvial materials, and when formed from unconsolidated volcanic materials they were originally the most fertile of the country. They still preserve some fertility despite poor methods of maintaining it (*4*).

In spite of exhaustive research in the chemical composition of soils in all parts of Greece, Hopkins (2, p. 446) was unable to find any soils containing 6,250 pounds of nitrogen per acre, the average for the highly productive soil of the great agricultural regions of the United States.

Good productive land of normal physical character should contain at least 1,800 pounds of phosphorus per acre of soil plowed to a depth of 6 inches. Only one-tenth of the soils examined by Hopkins contained this amount, and all these were located on mountain slopes or near the foot of mountains.

The prevailing opinion that all soils in Greece are rich in lime has been proved erroneous by Hopkins and other soil scientists and by the practical experience of Greek farmers, who have often discovered the value of adding ground limestone to soils without understanding the scientific principles involved. Specifically, Hopkins found practically no lime and resulting acidity in a number of regions, but in these the soils on the mountain or piedmont slopes, and even some valley soils, were found to be rich in lime. Hopkins generalized by stating that lack of lime content, that is, acid soil, is usually associated with plains, ridges, hills, or plateaus that have lost their original supply of lime and cannot receive additional supplies washed down from the higher lands. He concluded that soils should be tested individually. Fortunately limestone is available and can be supplied without much expense other than the labor of hauling it from local sources. Since the peasant has too much free time on his hands during certain seasons of the year, he should be taught the value of an organized program of soil testing, and the need of adding limestone to the soil should be demonstrated in the same way that brought about a successful spraying program for the grape vines and disinfection of grain seed before planting in the same regions.

Hopkins summed up (2, pp. 455-463) measures for soil improvement and maintenance of fertility in Greece by advocating that an adequate supply of phosphorus be made available, at reasonable cost, through government control of its importation, manufacture, distribution, and sale. By application of phosphorus and lime to soils deficient in these elements, the problem of soil fertility would be reduced to that involving the use of legumes, which applies to practically all the soils of Greece, including even the mountain soils. In his opinion, the most practical way to obtain soil improvement through legumes would be to plant a crop having great pasturage value during the fallow year. This could be plowed under or fed to livestock and returned to the land as manure.

Productivity

The customary procedure in discussing the efficiency of production techniques and farm organization is to dismiss the subject with a brief statement to the effect that the level of efficiency is low and cultural practices are primitive and unsatisfactory. A close study of Greek agriculture shows, however, a great variation in levels and quality of production (*8*, p. 152). This is true when comparing various commodities or the same commodity in different parts of the country.

One of the principal factors causing agricultural inefficiency in Greece is the lack of knowledge of improved agriculture. Another is the absence of farm implements and machinery and the lack of capital necessary to purchase this equipment. The wooden plow, dating back to antiquity; the brush harrow; the hand sickle for harvesting grain; the threshing floor of hard earth on which grain is threshed by driving animals over it, sometimes aided by a wooden sled with sharp flints fastened to the bottom, are the rule. The livestock are small and poorly fed. Grain is broadcast by hand. Commercial fertilizers and spraying materials are used only in the well-organized tobacco-, currant-, and raisin-producing regions. Crop rotations do not exist in most cases, unless leaving an average of 30 percent of all the fertile land in Greece as fallow can be called a primitive method of crop rotation and soil maintenance.

Frequently peasants do not conform to their climatic environment and attempt to produce crops not suited to the rainfall and temperatures prevailing in their community. Moreover, the lack of implements and draft power for proper tillage of the soil prevents the preservation of the major part of the moisture that is available.

In some cases farmers do a relatively good job of producing a commodity but fail to grade, package, and market the product properly (*5*, p. 68). For example, currants and raisins exported from Greece have been frequently harvested in a primitive, unsanitary manner and poorly packed in an unsorted state. Protests and discriminations by the foreign buyers and their local agents have resulted in the elimination of such harmful practices as drying currants on the bare ground and the introduction of better handling methods.

The tobacco-producing areas in Macedonia, Thrace, and the Volos region of Thessaly are relatively efficient. Suitable soil and climatic conditions, good production techniques, and many days of efficient work result in a high-quality product, greatly in demand on the foreign market. Undoubtedly the presence of American and other foreign specialists, who reside in the areas and survey developments throughout the year, has been an important factor in standardization. Similar tobacco is grown in Turkey and Bulgaria, and buyers have utilized selective buying and national competition to improve both the quality and the system of sorting and delivery.

When compared with the number and size of farms, the number of draft animals in Greece during pre-war years was adequate, particularly in the light of the shortages of feed, fodder, and pasture. The quality of the draft animals, however, was inferior, especially in southern Greece, where the animals were small and underfed.

Farm Machinery

For almost a million farms, latest available statistics (1930) show that there were in Greece 286,534 wooden plows, 271,548 metal plows, 700 tractors, 129,748 wooden or brush harrows, 20,327 metal harrows, 63,760 rollers (mostly logs), 181 grain drills and seeders, 27 fertilizer distributors, 454 binders, 214 hay rakes, 1,061 hay presses, 3,046 reapers and mowing machines, 606 threshing machines, and 1,562 fanning mills. The small size of farms and fields, topographical conditions, and low per capita wealth, combined with the surplus of agricultural labor available, make the use of large machinery on Greek farms unnecessary and in most cases uneconomical.

Tractors, reaping machines, and mowers have been owned and operated cooperatively in parts of Thessaly and Macedonia. Other machines, privately owned, thresh for farmers in exchange for from 8 to 10 percent of the grain threshed. Light steel plows and harrows, suited to local soils and climates, are advisable and were being rapidly increased in numbers before the war, chiefly from the plow factory at Volos. Grain drills could not be owned and operated by single farmers, but in a number of villages they were cooperatively owned. For a few cents per acre a peasant can use a grain drill which will increase his yield and save one-third of the seed required when broadcasting by hand. Threshing machines are sometimes owned cooperatively and save much of the grain formerly lost by the old primitive threshing methods. Increased amounts of machinery and equipment for handling currants, raisins, and olive oil have been utilized during the last few years. More steel plows, harrows, and other light implements for tilling the soil were also added. In many cases a group of men owned and used a harrow jointly.

DECREE OF DEPENDENCE UPON FOREIGN PRODUCTS

On the basis of the low standards of living among them, the Greek peasants are largely independent of foreign supplies. With the exception of wheat, which Greece imports to the extent of roughly 50 percent of its consumption, they produce just enough of the necessities of life for their own use. They make their own clothes, mill their own flour, breed their own livestock, make their own wine, in many cases manufacture their own shoes from the hides of pigs, horses, or cattle, make their own furniture, and so on.

Greece as a whole, however, is a net importer of all grains, dry legumes, all kinds of meat (despite large numbers of sheep and goats), fish, eggs, butter, margarine and other edible fats, and oilseeds. All the sugar, coffee, tea, and cocoa consumed are imported; and, of the industrial crops, cotton, hemp, jute, wool, and flax are imported, as are hides and skins. The most important food products exported consist of table grapes, citrus fruits, raisins, dried figs, wine, table olives, and olive oil. The most important nonfood export is, of course, tobacco. (See tables 4 and 5.)

The country is most deficient in wheat. This product provides 43 percent of the total caloric intake (table 6), and only 55 percent of the total consumption was provided for by domestic production. An average of 470,806 short tons were imself-sufficiency, production was expanded during the years immediately preceding the war, but the economic merits of this program are of doubtful value. The only surplus Provinces are Thrace, Macedonia, and Thessaly. The greatest deficits are in the Cyclades, Ionian Islands, Crete, and the Aegean Islands.

The consumption of rye and of maslin (a term usually applied to a mixture of wheat and rye but used to denote a combination of barley and oats in Crete and other Provinces) was covered by domestic production. In the case of the corn consumed by humans, home production was sufficient, but 48,810 short tons of corn and some quantities of other grains were imported for feeding purposes. All cereals, including rice, comprised 53 percent of the total caloric intake (table 6). Generally speaking, shortages of all these grains exist in southern Greece and the islands.

The average per capita production of barley in Crete is about as high as in Macedonia and slightly higher than in Thessaly. The production of oats is also high in Crete, as is the production of maslin, due to climatic conditions under which fall-planted barley and oats or a combination fall planting of the two is more suitable than wheat or rye. In general, southern and insular Greece are ill-suited to summer-grain production or to growing any crops without irrigation, which is insufficient for agriculture, apart from some horticultural products.

Corn predominates in Macedonia, which accounts for 40 percent of the total Greek production; Thrace produces 11.4 percent, Thessaly 10.5 percent, and Epirus 14.5 percent grown in the Valley of Yanina (Janina or Ioannina). Thus these areas, whose outturn is sufficient for local needs, produce about 77 percent of the total corn crop of Greece. The average import of 48,810 short tons, plus some diversion from the northern part of Greece, takes care of the shortage in southern Greece and the islands to some extent, but the more important measure is to substitute barley and oats as feed grains. Corn is utilized for direct human consumption chiefly in Macedonia, Thrace, Thessaly, and some of the other mountainous regions, which secure it from the surplus sections or by import from abroad into mountainous regions not far from a seaport. The ever present Greek donkey carries a surprisingly large amount of corn to the people of the mountain villages. Of the 32,132 short tons of rice consumed only 1,436 short tons are produced within the country, 35 percent in Epirus, 30 percent in Central Greece and Euboea, 28 percent in the Peloponnesus, and small amounts in Macedonia and Thrace. All parts of Greece are deficit areas, however.

Greeks consume few potatoes, the per capita production of the country being only 30.6 pounds annually. The principal producing regions are Peloponnesus, with 27 percent of the national total; Macedonia, with 17 percent; Central Greece, with 15; and Crete with 14 percent. Thus, the bulk of the production is in southern Greece and is of the early season type, with poor keeping and shipping quality. In terms of per capita production, for the country as a whole, each region practically takes care of its small consumption needs; the 5,728 short tons imported annually goes chiefly to the Piraeus-Athens region.

Legumes, including broad beans and kidney beans, are a favorite food of the Greeks. Generally speaking, these legumes are produced on a small scale under irrigation. Important producing Provinces include Macedonia, Crete, and Thessaly. Central Greece produces 45 percent of the chickpeas, and Peloponnesus is an important producer of lentils and kidney beans. Production in the islands, apart from Crete, is small, and they and the large cities are the principal consumers of the imported beans, chiefly kidney beans, of which over 50 percent of the Greek consumption is imported.

TABLE 4.-*Production, trade, and utilization of foodstuffs, average 1933-37*

COMMODITY	PRODUCTION	SEED AND WASTE[1]	NET IMPORTS + OR NET EXPORTS -	DEDUCTIONS, OTHER FEED AND USE	AVAILABLE FOR FOOD
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*
Wheat	784,980	216,695	+470,806	5,842	1,033,249
Corn	283,139	22,520	+48,810	194,776	114,653
Barley	218,652	53,089	+7,964	158,180	15,347
Oats	123,850	33,461	+2,469	92,858	–
Rye	65,363	18,133	–	881	46,349
Maslin	42,014	14,201	–	4,630	23,183
				AVAILABLE FOR DOMESTIC USE[2]	
Millet	1,796	214	+173	1,755	
Rice, milled[3]	1,436	207	+30,903	32,132	
Potatoes	142,844	44,824	+5,728	103,748	
Broad beans	17,082	2,215	+239	15,106	
Kidney beans	17,156	1,398	+20,013	35,771	
Chickpeas	11,268	1,521	+278	10,025	
Lentils	5,362	723	+798	5,437	
Other legumes	25,321	3,418	+274	22,177	
Cucurbit seeds	–	–	+1,189	1,189	
Sugar	–	–	+72,284	72,284	
Molasses	–	–	+3,513	3,513	
Vegetables	392,989	–	[4]+2,674	395,663	
Table grapes	82,480	–	-11,049	71,431	
Apples	7,866	–	+56	7,922	
Pears	20,463	–	–	20,463	
Figs, fresh	14,370	–	–	14,370	
Mulberries	2,264	–	–	2,264	
Citrus fruit[5]	47,812	–	-8,122	39,690	
Raisins	210,205	–	-110,433	99,772	
Figs, dried	29,165	–	-18,586	10,579	
Chestnuts	7,996	–	-137	7,859	
Almonds	7,791	–	-991	6,800	
Walnuts	6,201	–	-202	5,999	
Hazel nuts	427	–	–	427	
Carob nuts	28,100	–	-17,048	11,052	
Coconuts	–	–	+3,336	3,336	
Wine[6]	79,201	–	-12,707	66,494	
Meat,[7] total	111,473	–	[8]+22,263	133,736	
Beef & veal	16,143	–	+10,258	26,401	
Mutton, lamb, goat	67,670	–	+11,736	79,406	
Pork	13,481	–	+193	13,674	
Rabbit	1,305	–	–	1,305	
Poultry	12,874	–	+3	12,877	
Fish, total	17,792	–	+20,562	38,354	
Fresh (not herring)	17,792	–	+2,968	20,760	
Herring	–	–	+2,831	2,831	
Other fish	–	–	+14,763	14,763	
Eggs	[9]24,978	–	+1,039	26,017	
Milk, total	[10]296,272	–	+4,114	300,386	
Cow	90,357	–	–	90,357	
Buffalo	12,231	–	–	12,231	
Sheep	98,951	–	–	98,951	
Goat	94,733	–	–	94,733	
Cheese	64,295	–	-118	64,177	
Butter	6,630	–	+378	7,008	
Olive oil	127,020	–	-12,340	114,680	
Table olives	39,211	–	-15,733	23,478	
Margarine & other edible fats	(11)	–	+546	–	
Coffee	–	–	+6,236	6,236	
Tea	–	–	+193	193	
Honey	3,779	–	-57	3,722	
Cocoa	–	–	+1,524	1,524	
Seed oil,[12] total	6,751	–	+2,236	8,987	
Cottonseed	3,196	–	+114	3,310	
Sesame	3,555	–	+131	3,686	
Flaxseed	–	–	+1,872	1,872	
Peanut	–	–	+116	116	
Palm nut	–	–	+3	3	

See footnotes p. 90

[1] Waste is estimated at 5 percent of the crop for cereals; 10 percent for potatoes, and 3.5 percent for legumes.

[2] That used for industry and feed not available.

[3] Production (2,326 short tons), seed and waste- 335 short tons converted from rough to milled on the basis of 162 pounds rough rice = 100 pounds milled rice.

[4] There were 491 short tons of conserved vegetables exported, which are not included.

[5] Converted from numbers of fruits.

[6] In 1000 gallons. Production and exports of must converted to wine.

[7] Production and trade in meat has been estimated from number of live animals in the country and number imported.

[8] Includes 73 short tons of prepared meat imported, unclassified.

[9] 45,319,000 dozen converted to weight.

[10] For direct consumption; probably includes some milk fed to young.

[11] Not available.

[12] Estimated from seed.

Compiled by the Office of Foreign Agricultural Relations from official sources.

Fruits and Nuts

As stated above, Greece is an exporter of fruits and nuts, apart from importing negligible quantities of apples and dates for the luxury trade in the large cities. Olives are grown chiefly in southern Greece and the islands, the olive being tolerant of the dry climate, rocky topography, and light soils prevailing there. The most important surplus-producing regions for table olives are: Thessaly which accounts for 38 percent of the total Greek production; Central Greece and Euboea, 35 percent; and Crete, 7.2 percent. Thrace, producing only 1 percent of the national production; Macedonia, 2 percent; and Epirus, 4.6 percent, are the deficit regions. Regional production must, of course, be compared with total per capita production and per capita consumption when determining the degree of regional self-sufficiency or surplus. For example, although Epirus produces only 4.7 percent of the national production, it provides an average of 10.8 pounds for each of its own inhabitants or more than the national rate of consumption of 6.8 pounds. Peloponnesus produces only 4.0 pounds per capita and is a deficit area. The Aegean Islands, with a production of slightly less than 5 percent of the national production, produce 11.8 pounds per capita of its population. On the other hand, Central Greece and Euboea, with 35 percent of total national production, produce only 16.2 pounds per capita, due to their large urban population, but still have a surplus; and Thessaly produces 56.6 pounds per capita and has a large surplus.

Olive-oil production does not follow closely the pattern of table-olive production, despite statements frequently made to the contrary. For example, Thessaly produces only 2 percent of the olive oil of Greece and only 10.6 pounds per capita of its population as compared with the national average consumption of 34.4 pounds annually; hence it is a deficit region. This is also true of Central Greece and Euboea. On the other hand, the Ionian Islands (especially Corfu), which produce less than 1 percent of all the Greek table olives, produce 10.6 percent of the olive oil, an average of 121.1 pounds per capita, and for that reason are able to export several thousand tons of olive oil. Crete produces 27.4 percent of the total olive oil, or 168 pounds per capita of its population, and also has a large surplus.

Figs are grown in many parts of Greece, but most of the crop and practically all the surplus of dried figs for domestic use and export come from the Messinia and

Laconia sections of Peloponnesus, which, in fact, accounted for 83.3 percent of the total Greek production of dried figs. Peloponnesus also produces 24.6 percent of the fresh figs, whereas Crete produces 10 percent, Macedonia 10 percent, Epirus 10.5 percent, Central Greece 19.7 percent (but only 3.1 pounds per capita of its population and 2.2 percent of the total dried-fig production). The Ionian Islands supply 11.6 percent of total fresh figs but practically no dried figs, and the Aegean Islands produce their own needs of both.

Citrus culture is centered in Crete, the Laconia and Messinia sections of the Peloponnesus, Chios (Aegean Islands), Corfu (Ionian Islands), and the district of Arta (Thessaly) near the Ionian Sea. In contrast to the olive, citrus requires deep, rich, well-drained soils and therefore is found on the better land and also at lower elevations, in the valleys and on the lower slopes of the hillsides. Northern Greece and the upland regions of central and southern Greece are deficit regions.

The pome fruits are relatively unimportant in Greece. The annual crop of pears averaged about 20,500 tons during 1933-37 and the apple crop, about 8,000 tons. Crete accounted for 27 percent of the pears and 3 percent of the apples; Macedonia 5.3 and 7.4, respectively; Thessaly 7 and 59; and the Peloponnesus 33.5 and 10 percent.

The production of the stone fruits, such as cherries and plums, is so small that a statistical analysis cannot be made. Unfavorable climatic conditions and a lack of local interest make increased attention to these fruits doubtful.

Nut culture has become of increasing significance in Greece during the last 10 years. Almonds are grown throughout southern Greece, especially in the Lasithion section of Crete and the Island of Chios in the Aegean group. There are few plantings that one can classify as orchards, and the majority of the trees are scattered among the cultivated fields and vineyards. A little more than 10 percent of the crop was exported annually during the pre-war years. On higher elevations and farther to the north chestnuts and walnuts are produced in amounts comparable to the almond crop. Carob pods have become important, and over 10,000 tons were exported annually during the 1933-37 period.

Grapes and Wine

Throughout history the grape has been a fundamental part of Greek agriculture and of the national economy, in terms of both national income and export value. The

TABLE 5.–*Production, trade, and amount of specified industrial products available for domestic use in Greece, average 1933-37*

COMMODITY	PRODUCTION	NET IMPORTS + OR NET EXPORTS -	AVAILABLE FOR DOMESTIC USE	COMMODITY	PRODUCTION	NET IMPORTS + OR NET EXPORTS -	AVAILABLE FOR DOMESTIC USE
	Short tons	*Short tons*	*Short tons*		*Short tons*	*Short tons*	*Short tons*
Tobacco	64,596	-45,134	19,462	Cocoons	2,899	[2]-77	2,822
Anis	386	–	386	Olive residue, as oil[3]	2,461	-2,461	–
Mastic	302	-265	37	Hides and skins:			
Cotton, ginned[1] . .	13,315	+6,419	19,734	Raw	(4)	+3,143	[5]3,143
Hemp	–	+2,888	2,888	Prepared	(4)	+129	[5]129
Jute	–	+2,515	2,515	Chemical fertilizer	(4)	+28,580	[5]28,580
Wool	10,744	+2,732	13,476	Wood pulp	–	+18,762	18,762
Flax	–	+ 65	65	Animal fat, nonedible	(4)	+158	[5]158

[1] One-third of unginned cotton. [2] Includes some waste. [3] Estimated. [4] Not available. [5] Plus domestic production.

Compiled by the Office of Foreign Agricultural Relations from official sources.

total income from vineyarding is exceeded only by that from all cereal grains and that from tobacco. Tobacco alone has a greater export value, and until recent years this was exceeded by that of currant and raisin exports. Greece's soil, climate, and the heavy concentration of agricultural population are all favorable to the culture of the vine (*5*, p. 63). Vineyarding in Greece is a varied industry, and its component parts - production of wine, table grapes, currants, and raisins - must be studied separately.

Wine grapes are grown in various parts of Greece, and the types of wine produced vary considerably, from very bitter wine (the so-called *retsina* or resinated wine) to thick, very sweet wines, made from raisin-type grapes. Nearly 15 percent of the wine is normally exported. Principal producing and surplus regions include Central Greece and Euboea, which produce 31.3 percent of the total production (measured in terms of must, that is, the new, as yet unfermented wine) and 17 gallons per capita. The per capita annual total consumption is about 9.8 gallons. Crete produces 12 percent or 27 gallons per capita, the Peloponnesus 31.8 percent or 27 gallons per capita, the Ionian Islands 4.3 percent or 18 gallons per capita, and Thessaly 5.1 percent or 9 gallons per capita. The remaining Provinces, especially Thrace, are deficient, except the Cyclades, which produce 13 gallons per capita, but only 2 percent of the total Greek production.

Table grapes, chiefly white, sweet, seedless varieties, have become increasingly important in the last few years, largely due to an export market in Germany and other parts of Central Europe. Practically all parts of Greece now produce table grapes, including Provinces, like Macedonia, that grow few wine grapes. The Macedonian production, which reaches 18 percent of the total outturn, however, is only equal to 19 pounds per capita, about the rate for all Greece. Crete produces 13.7 percent or 54 pounds per capita, Thessaly 11.8 percent or 36 pounds per capita, the Peloponnesus 26.9 percent or 39 pounds per capita. Central Greece produces 11.5 percent but only 11 pounds per capita because of the large urban population of the Athens-Piraeus region, and hence brings in grapes from other regions, largely by water. Fresh grapes, of course, are perishable and cannot be refrigerated for local shipping as is done for more profitable export trade.

Currants, which are actually small, seedless raisins, are an important crop in Greece and prior to 1910 were the only export product of much importance (*5*, p. 63). Due to the ravages of phylloxera in France, the French imported large quantities of Greek currants for its sweet-wine industry. Greece is still the principal producing and exporting country of currants, with a total production of 175,000 short tons annually during the 1933-37 period and an average export of 82,250 tons. The production is extremely localized in the Corinth section of the Peloponnesus, where 92.7 percent of the national crop is secured. The Ionian Islands produce 6.6 percent, and the remainder is grown on the northern shore of the Gulf of Corinth in the Province of Central Greece and Euboea.

There are two types of raisins produced in Greece, the Sultana (or Sultanina) and the Rozaki (Rozake). Crete produces practically all of the Rozaki (97.6 percent) and over half the Sultanas. About four-fifths of the national export of 28,150 short tons also come from Crete. The Messinia and Elis sections of the western coast of the Peloponnesus produce 37.5 percent of the Sultanas and most of the remainder (1.3 percent) of the Rozaki.

Vegetable growing is carried on throughout Greece and includes a great variety of vegetables, especially onions, leeks, garlic, cabbage, cauliflower, lettuce,

TABLE 6.- *Estimated food consumption in Greece, by groups of foodstuffs, average 1933-37*

PRODUCTS	DOMESTIC CONSUMPTION TOTAL	DOMESTIC CONSUMPTION PER CAPITA[1]	AVERAGE INTAKE PER DAY	DOMESTIC PRODUCTION AS PERCENTAGE OF TOTAL CONSUMPTION
	Short tons	*Pounds*	*Calories*	*Percent*
Grain,[2]	1,052,122	309.8	1,251	85.45
Wheat	878,261	258.6	1,044	55.00
Corn	97,454	28.7	116	100.00
Barley	11,510	3.4	13	100.00
Rye	41,713	12.3	50	100.00
Maslin	23,184	6.8	28	100.00
Rice	32,123	9.5	38	3.83
Potatoes	103,748	30.5	34	94.48
Sugar	72,284	21.3	106	0
Honey	3,722	1.1	0.4	100.00
Dry legumes[3]	88,516	26.1	97	75.59
Fresh vegetables	395,663	116.5	43	99.27
Citrus fruits	39,690	11.7	10	97.60
Other[4]	224,540	66.1	58	99.97
Olives	23,478	6.9	12	100.00
Nuts, shelled[5]	11,358	3.3	25	100.00
Wine	272,615	80.3	80	100.00
Olive oil	114,680	33.8	377	100.00
Other vegetable oils	8,987	2.6	30	73.50
Butter	7,008	2.1	18	94.61
Lard & animal fats	772	.2	2	90.00
Meat, total	133,736	39.4	74	83.35
Pork	13,674	4.0	7	98.59
Beef & veal	26,401	7.8	14	61.15
Lamb, mutton & goats	79,406	23.4	44	85.22
Other meat[6]	14,255	4.2	8	99.98
Fish	38,354	11.3	14	44.88
Eggs	26,017	7.7	13	96.00
Whole milk	300,386	88.4	77	98.63
Cheese	64,177	18.9	82	99.50
Cocoa	1,524	.4	2	0
Coffee	6,236	1.8	—	0
Tea	193	.1	—	0
Total	3,021,929	889.8	2,443.4	

[1] Population 1935 - 6,792,270.

[2] Grain in terms of flour.

[3] Includes broad beans.

[4] Berries not included.

[5] Chestnuts, almonds, walnuts, and hazel nuts.

[6] Includes 73 tons of unclassified, imported, prepared meat.

[7] 83 eggs per capita per year; weight of one egg = 1.5 ounces.

Compiled by the Office of Foreign Agricultural Relations from official sources.

spinach, artichokes, and beets (potatoes and legumes have already been discussed above). Important Provinces for vegetable production include Macedonia, accounting for 24.9 percent of the Greek total; Central Greece, 14.4 percent, due to the commercial production near Athens-Piraeus and Thessaloniki; and the Peloponnesus, 21.8 percent. Generally speaking, the other Provinces produce enough for their average consumption of from 100 to 120 pounds per capita. As in most countries, few fresh vegetables are produced or consumed by the mountain people, and this is unfortunately true also in the tobacco-growing sections of Thrace and Macedonia, where practically all the land is planted to this crop.

Tobacco

The most important nonfood crop in Greece is tobacco, which is also the largest export commodity, accounting in 1933-37 for 43.6 percent of the value of total exports and over 15 percent of the total value of agricultural production. A study of production figures for 1936 (*7*, p. 158) indicates that 272,000 acres of tobacco returned an income of 3,500,000,000 drachmas (about $32,000,000 at 1937 average rate of exchange), 161,000 acres of currants returned 1,000,000,000 drachmas ($9,000,000), and 2,063,000 acres of wheat, only 3,000,000,000 drachmas ($27,000,000), despite the fact that wheat production was assisted by a subsidy that made the farm price nearly three times the world price of wheat.

Tobacco grown in Greece is of the "Oriental" or "Turkish" small-leaf type, and its cultivation is chiefly on the nonhumus soils in the arid summer valleys of Thrace, Macedonia, and Thessaly. During 1933-37 Macedonia produced 53 percent of the total crop, Thessaly 12.3 percent, Thrace 8.3 percent, and Central Greece and Euboea 15.8 percent. The best quality was produced in Thrace. In all these regions monoculture prevails; that is, tobacco is grown on the same land year after year, and, moreover, the farms average from 2 to 5 acres only in size.

Animal Husbandry

Animal husbandry in Greece has been greatly influenced by environmental conditions (*8*, p. 163). Lack of all-season pastures and fertile meadowland has resulted in the development of a seminomadic method of pasturing sheep and goats - utilizing the green vegetation of the plains during the rainy winter months and moving up into the mountains during the summer. Due to redistribution of land among the refugees and fixed ownership of land formerly of doubtful title, nomadic activities have been restricted, and all-season husbandry in the plains has increased. Sheep and goats are by far the most important animals both as to numbers and value of livestock products. Dual-purpose cattle (labor and milk) are used in the plains, and cattle for dairy purposes alone exist to a limited extent in the vicinity of Athens-Piraeus and Thessaloniki. There is only one horse for every five farms, and the bulk of the work is done by oxen, buffaloes (chiefly dual-purpose), and dual-purpose cows. The donkey is used throughout the country as a beast of burden, especially in the southern part and in the mountainous regions. Swine numbers are small, due to the shortage of feed. Farms have on an average only about 12 fowls, which are usually of a nondescript type kept under primitive conditions and producing few eggs. Difficulty is experienced in giving a regional picture of animal husbandry in Greece, because all Provinces have mountainous, semimountainous, and plain regions. The greatest shortages of meat and dairy products prevail in the Provinces with the largest urban population. Imports of meat and dairy products are principally for these urban centers and consist chiefly of live cattle and sheep for slaughter.

The peasants throughout Greece consume chiefly mutton and lamb; fowls are eaten only at holiday seasons. A good share of the beef, including practically all the imported meat, is consumed in the cities as is most of the pork.

A sanitary whole-milk supply is not available to many people. There are a few modern dairies near Athens and Thessaloniki, but in general all milk is boiled (or more properly, scalded). Due to the short lactation period of the dual-purpose cows, cow's milk is available to the bulk of the population on a seasonal basis only. Most of the milk used is sheep's milk, during the spring and early summer, and goat's milk, during a somewhat longer period. Little butter is consumed in Greece and that chiefly by the well-to-do people in the cities. On the other hand, cheese is eaten by nearly every one. The principal types of cheese are the "feta" (white cheese) and the "kashkaval" (yellow cheese), both made largely from sheep's milk, pressed and salted, or kept in brine. This enables the cheese to be shipped easily from one part of the country to another. Moreover, it is made locally in many communities, and shortages are therefore unlikely to exist.

AGRICULTURE AND THE FOOD SITUATION DURING WARTIME

Following the outbreak of the war in 1939 the foreign trade of Greece in food and other Agricultural products necessary to supplement home production (see table 4) was adversely affected but not to the extent experienced later, when naval warfare in the Mediterranean greatly reduced normal imports of wheat, meat, fish, dairy products, legumes, and sugar. After the occupation of the country by the Axis in 1941, these imports were cut off altogether until the beginning of the importation of some grain, legumes, and powdered milk through the International Red Cross and later the International Swedish-Swiss Commission. Thus practically the whole burden of supplying the food needs of the country fell upon local production, inadequate even during peacetime, as already indicated.

Mobilization of the army in the fall of 1940 resulted not only in the loss of peasant manpower, but about 40 percent of the agricultural draft animals were requisitioned which included, of course, the younger and more valuable animals. The shortage of manpower, draft power, spraying materials, and other pertinent factors combined with the most severe drought in modern Greek history during 1941 to reduce production to a minimum. Large stocks of grain, meat, olive oil, and other foodstuffs were seized by the Axis forces. Many draft animals, lost during hostilities or retained by the occupying forces, were never returned to the farms from which they had originally been taken, and the invasion in the spring of 1941 caught a large number of the nomadic flocks in the plains, where heavy losses were sustained before they could be taken to the comparative safety of the mountains.

Reduced supplies of bread and other essential foodstuffs have made ration allowances often unobtainable for days at a time, and discrepancies in distribution have been great. Most affected has been the Athens-Piraeus urban area, with a population of a million, further increased by many refugees from the north. Some of the islands and parts of the Peloponnesus, the urban regions in other parts of the country, the tobacco-producing areas, and those where shortages of grain usually exist have also suffered. Most fortunate are the peasant populations of grain-producing regions, where hoarding has maintained the food level at a relatively high rate. The surplus grain-producing areas of Thrace and eastern Macedonia have been occupied by the Bulgarians, and no food from these surplus-producing regions has reached other parts of Greece. The surplus area in the plain region of Thessaly has also been cut off from the remainder of the country.

Lack of seed, which in many regions has been consumed for food, has reduced the area planted, as has the shortage of manpower and draft animals. The high price of grain and fodder and the shortages of feed in some regions have resulted in large-scale slaughtering of animals, and much meat has been requisitioned by Axis forces. The supply of fish has also been drastically reduced. Olive-oil production, the chief source of fats in normal times, has been curtailed due to a shortage of labor and in some cases damage to the equipment or shortage of oil for operation. Large supplies of olive oil have also been confiscated. The important citrus, grape, currant, and raisin crops have suffered greatly from an almost complete shortage of copper sulfate and other spray materials and from a shortage of labor. Vegetable production has not been completely maintained despite efforts of the local authorities, because of lack of facilities for keeping up irrigation systems and other causes. Transportation facilities for moving the surplus supplies to deficit regions have also been available to a limited extent only, and confiscations have been heavy.

Despite this gloomy picture, the more extremely pessimistic estimates that stress an almost complete cessation of plant production and the disappearance of from 75 to 90 percent of total animal numbers cannot be justified at the present time. Peasant farmers always succeed in producing a crop some way, even though it is a small one. The primitive nature of both farming practices and implements employed in agriculture, as well as the depletion of soil fertility and unfavorable climatic conditions for certain crops, the poor quality of much of the livestock, and poor feeding and management practices have resulted in very low yields even in normal years. Consequently, war or other unfavorable conditions do not affect yields so much as would be the case in countries where a higher efficiency is maintained. Shortage of manpower is also relatively less important in Greece, where the women and children do a large share of the farm work even in normal times.

LITERATURE CITED

(1) HILL, HENRY A.
1942. THE ECONOMY OF GREECE, PART I. (Prepared for the Coordinating Committee of American Agencies in Greece.) 45 pp., illus. Greek War Relief Association, New York.

(2) HOPKINS, CYRIL G.
1922. HOW GREECE CAN PRODUCE MORE FOOD. Ill. Agr. Expt. Sta. Bul. 239: [433]-467, illus.

(3) INTERNATIONAL INSTITUTE OF AGRICULTURE.
1939. LAND RECLAMATION AND IMPROVEMENT IN EUROPE. League of Nations document No. 4 for European Conference on Rural Life 1939. 51 pp., illus. Rome.

(4) MARBUT, C. F.
1925. THE RISE, DECLINE, AND REVIVAL OF MALTHUSIANISM IN RELATION TO GEOGRAPHY AND CHARACTER OF SOILS. Assoc. Amer. Geog. Ann. 15: 2-29. (Presidential address at the Washington meeting, Dec. 30, 1924.)

(5) MEARS, ELIOT GRINNELL.
1929. GREECE TODAY: THE AFTERMATH OF THE REFUGEE IMPACT. 292 pp., illus. Stanford University and London.

(6) NEWBIGIN, MARION I.
1919. GEOGRAPHICAL ASPECTS OF BALKAN PROBLEMS. . .238 pp., illus. New York.

(7) ROYAL INSTITUTE OF INTERNATIONAL AFFAIRS.
1939. SOUTH-EASTERN EUROPE; A POLITICAL AND ECONOMIC SURVEY. 203 pp., illus. London, New York etc.

(8) SERVAKIS, GEORGES, AND PERTOUNTZI, C.
1933. THE AGRICULTURAL POLICY OF GREECE. *In* Morgan, O. S., ed., Agricultural Systems of Middle Europe, pp. 141-195, illus. New York.

(9) VALKENBURG, SAMUEL VAN, AND HUNTINGTON, ELLSWORTH.
1935. EUROPE. 609 pp., illus. New York and London.

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